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10/614,055	07/08/2003	Toshiyuki Okumura	Q74987	9769

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EXAMINER	
GARCIA, LUIS	
ART UNIT	**PAPER NUMBER**
2613	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/614,055	OKUMURA ET AL.	
	Examiner	Art Unit	
	Luis F. Garcia	2613	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *28 September 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *11-18* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *16-18* is/are allowed.

6)☒ Claim(s) *11-15* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. Applicant's arguments with respect to claim 11 have been considered but are moot in view of the new ground(s) of rejection. Bhat does in fact disclose the limitation of previously objected to limitation of "gain compensating means".

Claim Objections

2. Claim 11 is objected to because of the following informalities: "optical signal" should be changed to "optical signals" ln2-3. Appropriate correction is required.

Claim 16 is objected to because of the following informalities: "optical signal" should be changed to "optical signals" ln2-3. Appropriate correction is required.

Claim 17 is objected to because of the following informalities: "related said optical switch" should be changed to "related to said optical switch". Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. **Claim 12 is rejected** under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. It is unclear what self-diagnosis means operation is based on, e.g. claim 11 states the "self-diagnosis means operates based upon said converting correction gain"; however, dependent claim 12 states

the "self-diagnosis means operates based upon said controller output correction value".

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. **Claims 11-12 and 14-15 are rejected** under 35 U.S.C. 102(e) as being anticipated by Bhat et al (US 2002/0176648).

Regarding claim 11, Bhat discloses an optical switching subsystem comprising:

a plurality of input optical ports for inputting an optical signal **(FIG. 2 (I_1,I_2-input ports) and ¶0066)**;

a plurality of output optical ports for outputting the optical signal **(FIG. 2 (O_1,O_2-output ports) and ¶0066)**;

an optical switch formed by a micro electromechanical system (MEMS) for switching an optical path among said input optical ports and said output optical ports **(FIG. 2 (MEMS: M_{R1},M_{R2},M_{S1},M_{S2}) and ¶0034,0063-0064, in which the optical switch is formed by MEMS and switches an optical path among input/output ports)**;

a controller for instructing said optical switch to execute switching operation **(FIG. 2 (300-PROCESSOR SYSTEM) and ¶0068-0069 in which the Processor System generates control output signals for instructing the optical switch to reposition (execute switching operation))**;

self-diagnosis means for measuring performance characteristics of said optical switching subsystem **(FIG. 2 (Sensor System, Processor System) and ¶0037,0045,0067 in which the sensor system (part of self-diagnosis means), measures the signal intensity (performance characteristic) and generates an error signal based on the signal intensity)** and diagnosing said optical switching subsystem based upon said performance characteristics **(FIG. 2 (Sensor System, Processor System) and ¶0044-0046 in which the processor system (part of self-diagnosis means) uses the sensor system's error signal (based on measured values) to diagnosis the optical switch (e.g. determines, via algorithm, how to minimize the error in which minimizing the error improves the signal transmission/signal intensity, (performance characteristic)))**; and

calibration means for calibrating control over the operation of said optical switch **(FIG. 2 (200-Sensor System, 300-Processor System, 340-Calibraiton Algorithm) and ¶0046 in which the calibration algorithm (part of calibration means) calibrates the position of the MEMS mirrors (control over the operation of said optical switch) for minimizing error in mirror alignment)**,

wherein said calibration means comprises gain compensating means for compensating converting correction gain between control input and control

output of the optical switch **(FIG. 2 (Processor System, 330-compensator) and ¶0048 in which the compensator provides an offset value for compensating for the optical switch's non-ideal properties and environmental conditions-¶0069. Therefore, the compensator corrects for the non-ideal input-output characteristics of the optical switch (compensating converting correction gain between control input and control output of the optical switch))** and said self-diagnosis means operates based upon said converting correction gain **(FIG. 2 (300-Processor System) and ¶0048 in which the processor system (self-diagnosis means) operates in part based on the compensator's signal (e.g. processor circuit sets offset values in part based on the signals received from compensator))**.

Regarding claim 12, Bhat discloses the optical switching subsystem according to Claim 11 as applied above.

Bhat further discloses wherein said calibration means comprises compensating means for calculating a controller output correction value **(FIG. 2 (340-Calibration Algorithm) and ¶0046 in which the Calibration Algorithm minimizes the error signal by compensating for parameter(s) (e.g. calculating a controller output correction value) which effects the optical signal transfer efficiency)** and said self-diagnosis means operates based upon said controller output correction value **(FIG. 2 (300-Processor System) and ¶0046 in which the processor system uses (operates based on) the calibration algorithm (controller output correction value))**.

Regarding claim 14, Bhat discloses the optical switching subsystem according to claim 11 as applied above.

Bhat further discloses wherein the calibration means operates when the self-diagnosis means determines that a corresponding reflecting mirror of the optical switch fails based on measured performed characteristics **(FIG. 2 (300-Processor System, 340-Calibration Algorithm) and ¶0046 in which the Calibration Algorithm operates when the Processor System determines that the error (measured performance characteristic) in the optical switch has surpassed an allowable tolerance (failed based on measured performance characteristics))**.

Regarding claim 15, Bhat discloses the optical switching subsystem according to Claim 14 as applied above.

Bhat further discloses wherein the self-diagnosis means operates again after the calibration is executed by the calibration means **(FIG. 2 and ¶0046 in which the Processor System (e.g. includes calibration algorithm))**, and the self diagnosis means notifies a host system when it is diagnosed at that time that the corresponding reflecting mirror fails **(FIG. 2 (300-Processor System) and ¶0071-0072 in which the Processor System receives control signals from the remote communications line (host system) containing: updated control algorithms, calibration data, and other parameters which control a MEMS mirror set point; therefore, the Processor System inherently communicates with the host system, via remote communications link, about the system status (e.g. of a failed mirror). Reason being that calibration data, control**

algorithm and parameter updates serve the purpose of making the system more accurate in its MEMS mirror alignment; therefore, the host system needs feedback (notification) from the Processor System to know if certain values/tolerances should be updated).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. **Claim 11 is rejected** under 35 U.S.C. 103(a) as being unpatentable over Oettinger et al (US 6,708,082) in view of Mills et al (US 6,363,182), Oettinger et al hereinafter referred to as Oettinger and Mills et al hereinafter referred to as Mills.

Regarding claim 11, Oettinger discloses an optical switching subsystem comprising:

a plurality of input optical ports for inputting an optical signal **(*Abstract* in which MEMS mirrors which inherently have at least one input port)**;

a plurality of output optical ports for outputting the optical signal **(*Abstract* in which MEMS mirrors which inherently have at least one output port)**;

an optical switch formed by a micro electromechanical system (MEMS) for switching an optical path among said input optical ports and said output optical

ports **(Abstract and col2 ln39-49 in which the optical switch is formed by MEMS mirrors which inherently have at least one input port and one output port)**;

a controller for instructing said optical switch to execute switching operation **(Abstract and col1 ln8-12, col1 ln38-49 in which the control system (controller) controls (instructs) the optical switch to operate)**;

self-diagnosis means for measuring performance characteristics of said optical switching subsystem **(FIGs. 1 (12-measure MEMS mirror gain), 2 (Sensor) and col4 ln12-16)** and diagnosing said optical switching subsystem based upon said performance characteristics **(col4 ln12-26 and FIG. 1 in which the control system (self-diagnosis means) configures the optical switching subsystem based on the measured performance characteristics (e.g. resonant frequency and MEMS mirror gain))**; and

calibration means for calibrating control over the operation of said optical switch **(col3 ln14-28 in which the controller (calibration means) calibrates control over the operation of the optical switch via calibration equations-col3 ln22-27)**,

wherein said calibration means comprises gain compensating means for compensating converting correction gain between control input and control output of the optical switch **(FIGs. 1,2 and col3 ln28-55 in which the estimator uses equation-col3 ln31-35 to compensate for MEMS mirror gain variation between the control input (e.g. X1(k)) and control output (e.g. X1(k+1)) of the optical switch)** and said self-diagnosis means operates based upon said

converting correction gain **(FIG. 1 and col4 ln12-34 in which the self-diagnosis means (e.g. control system) operates based upon the converted correction gain; thereby, optimizing the MEMS mirror control loop performance)**.

Oettinger does not expressly disclose a plurality of input optical ports for inputting an optical signal;

a plurality of output optical ports for outputting the optical signal;

an optical switch formed by a micro electromechanical system (MEMS) for switching an optical path among said input optical ports and said output optical ports.

Mills teaches a plurality of input optical ports for inputting an optical signal **(FIGs. 1,2)**;

a plurality of output optical ports for outputting the optical signal **(FIGs. 1,2)**;

an optical switch formed by a micro electromechanical system (MEMS) for switching an optical path among said input optical ports and said output optical ports **(FIGs. 1,2 and col4 ln29-47)**.

It would have been obvious to one of ordinary skill in the art at the time of invention to modify Oettinger and incorporate Mills' teachings of using an optical switch with a plurality of input ports and outputs ports for switching the optical path among the ports. The motivation being that this allows the system to create multiple connections between input and output ports at a time at taught by Mills col1 ln16-26 and FIGs. 1,2; thereby, improving functionality.

Allowable Subject Matter

6. Claims 16-18 are allowed.

Conclusion

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Wong et al (US 6,529,654)-apparatus for controlling/calibrating an optical mirror system using: feedback, a measured parameter and control circuit.

Mori et al (US 6,711,314)-optical switch control method using: feedback, a measured/monitored parameter, control circuits and a switch control circuit.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Luis F. Garcia whose telephone number is (571)272-7975. The examiner can normally be reached on 8-4:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ken N. Vanderpuye can be reached on (571)272-3078. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

LG

KENNETH VANDERPUYE
SUPERVISORY PATENT EXAMINER